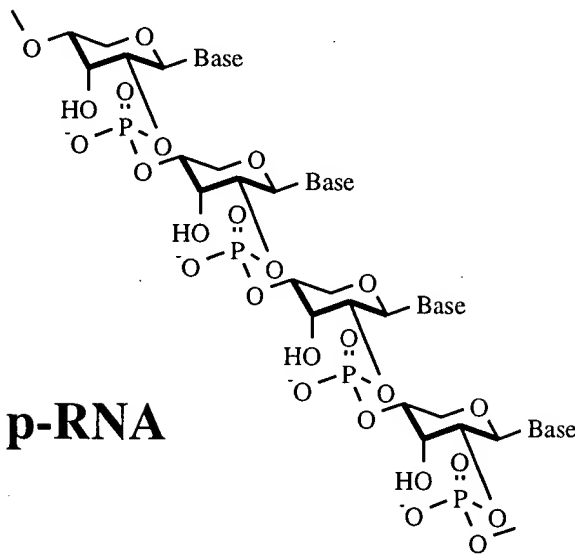
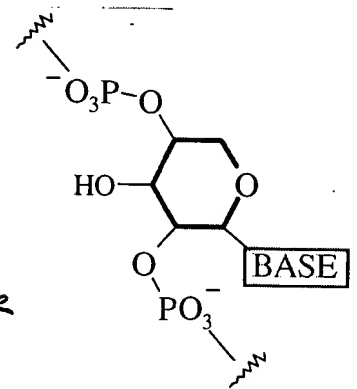


Figure 1 - p-RNA Structure

Pyranosyl-RNA



p-RNA unit structure



Advantageous properties:

Watson-Crick pairing mode exclusively

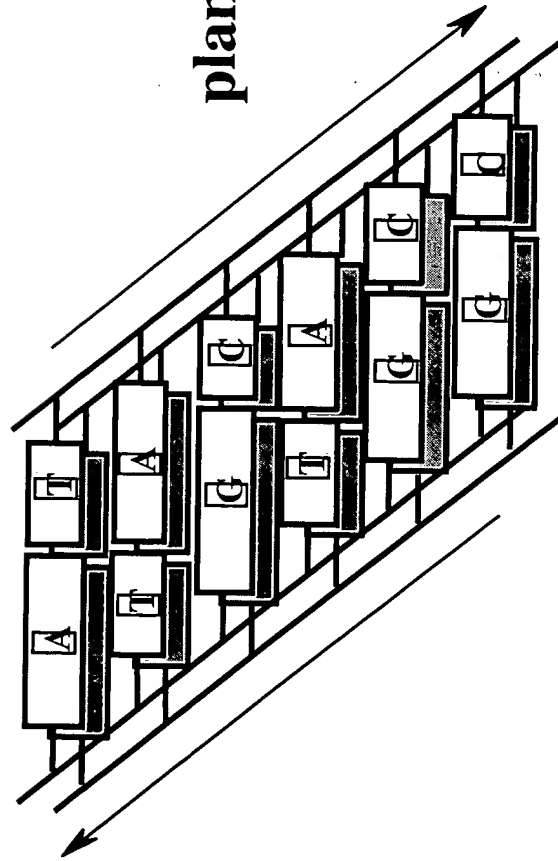
Antiparallel strand orientation exclusively

- Duplexes *more stable* than in DNA or RNA
- Duplexes have a *quasi-linear* ladder structure
- Pairing is *enantioselective*
 - Potential to replicate *without enzymes*
(thus prebiotic ancestor to RNA?)
 - No pairing with DNA or RNA

662130 0204250

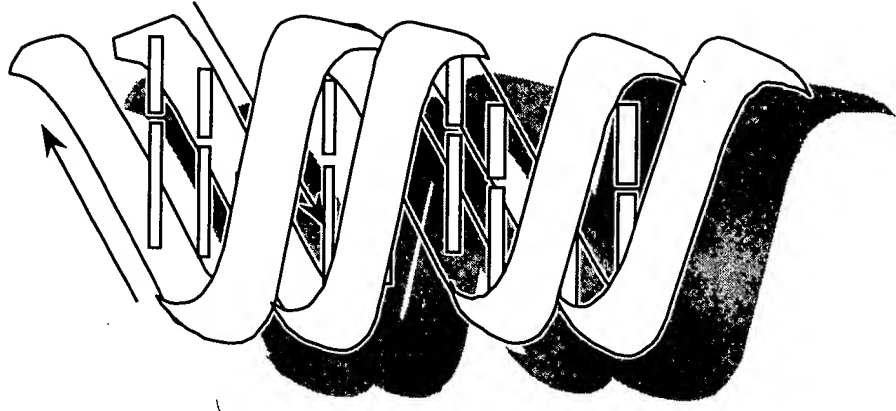
Figure 2- p-RNA Planar and DNA Helical Structures

p-RNA



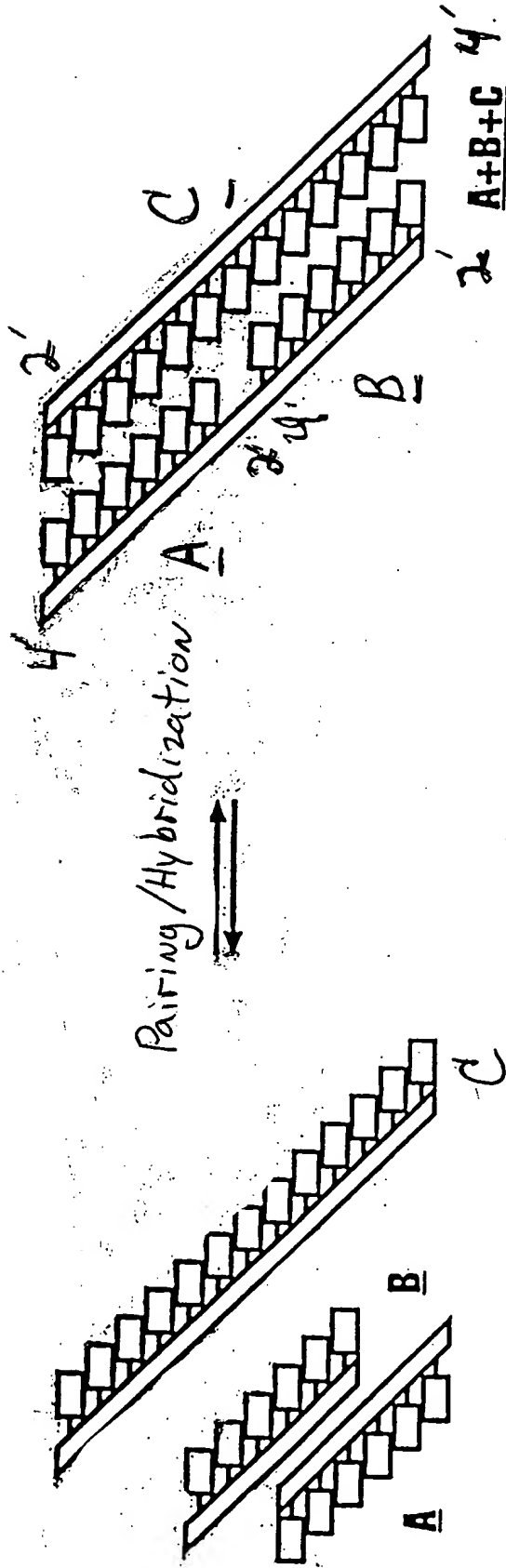
planar

DNA / RNA



helical

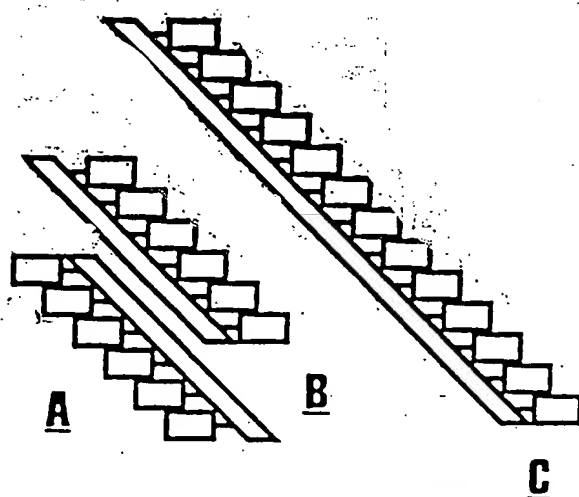
Figure 3- p-RNA Components A, B, and C



p-RNA Components
A, B, and C
un-paired

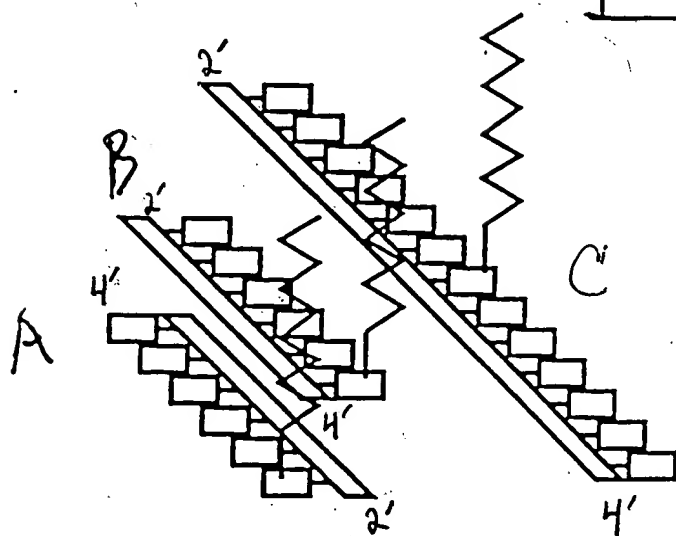
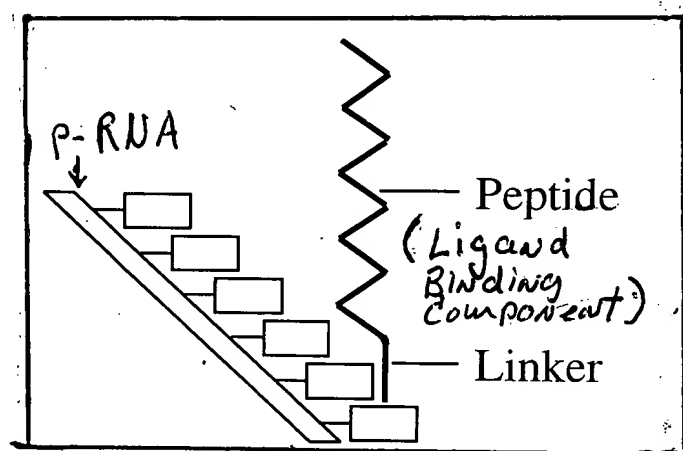
p-RNA Components
A, B, and C
paired or hybridized

Figure 4- p-RNA Peptide Derivatized A, B, + C Components



p-RNA Components
 ← A, B, and C
 (Programmable Pairing Components)

Linking of
 peptide library
 with p-RNA
 Components A, B, + C



p-RNA Peptide
 derivatized
 ← A, B, and C
 Components

(Intermolecular Ligand
 Binding Components)

55700 034400

Figure 5- Supramolecular Complex Formation with Ligand Molecule

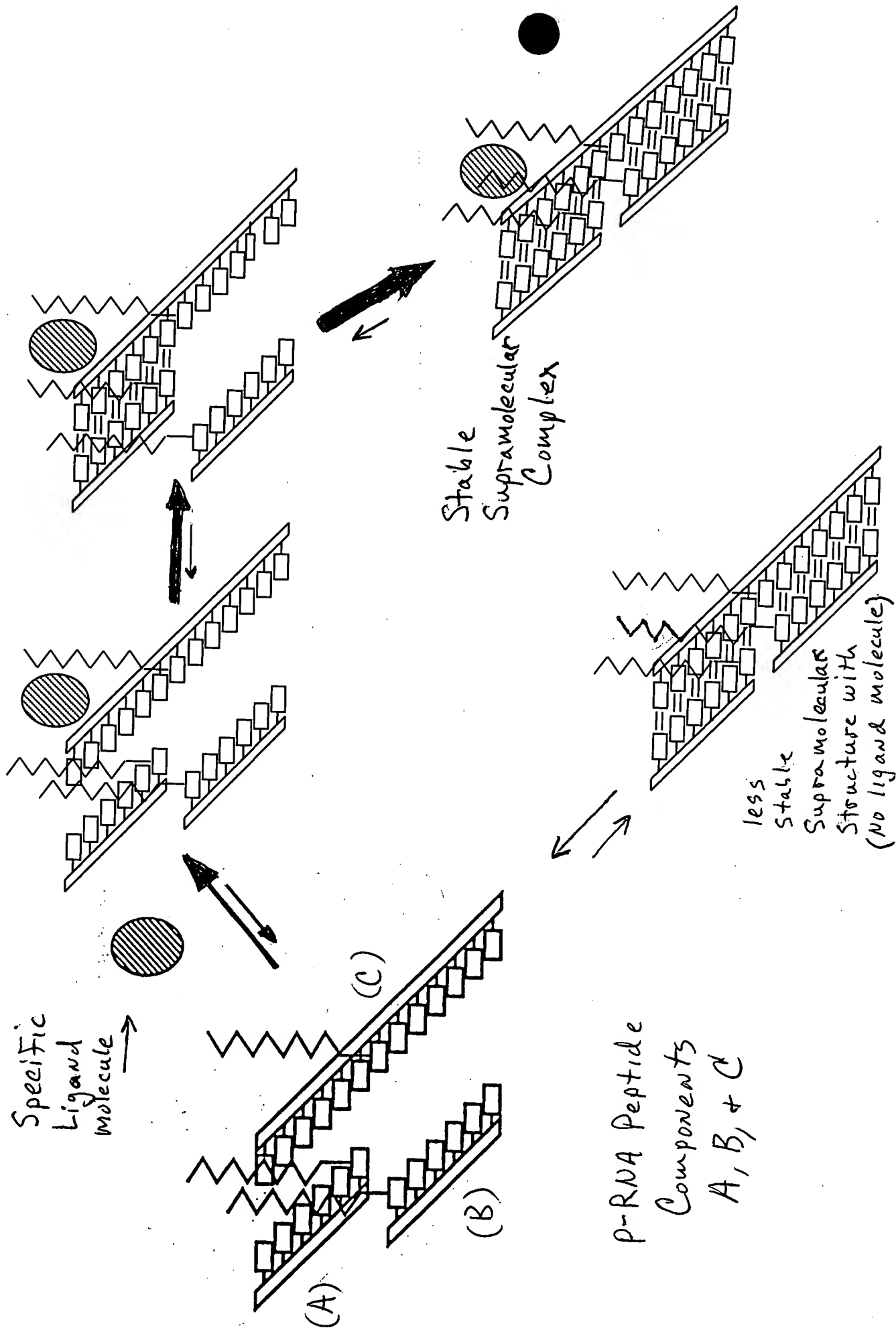
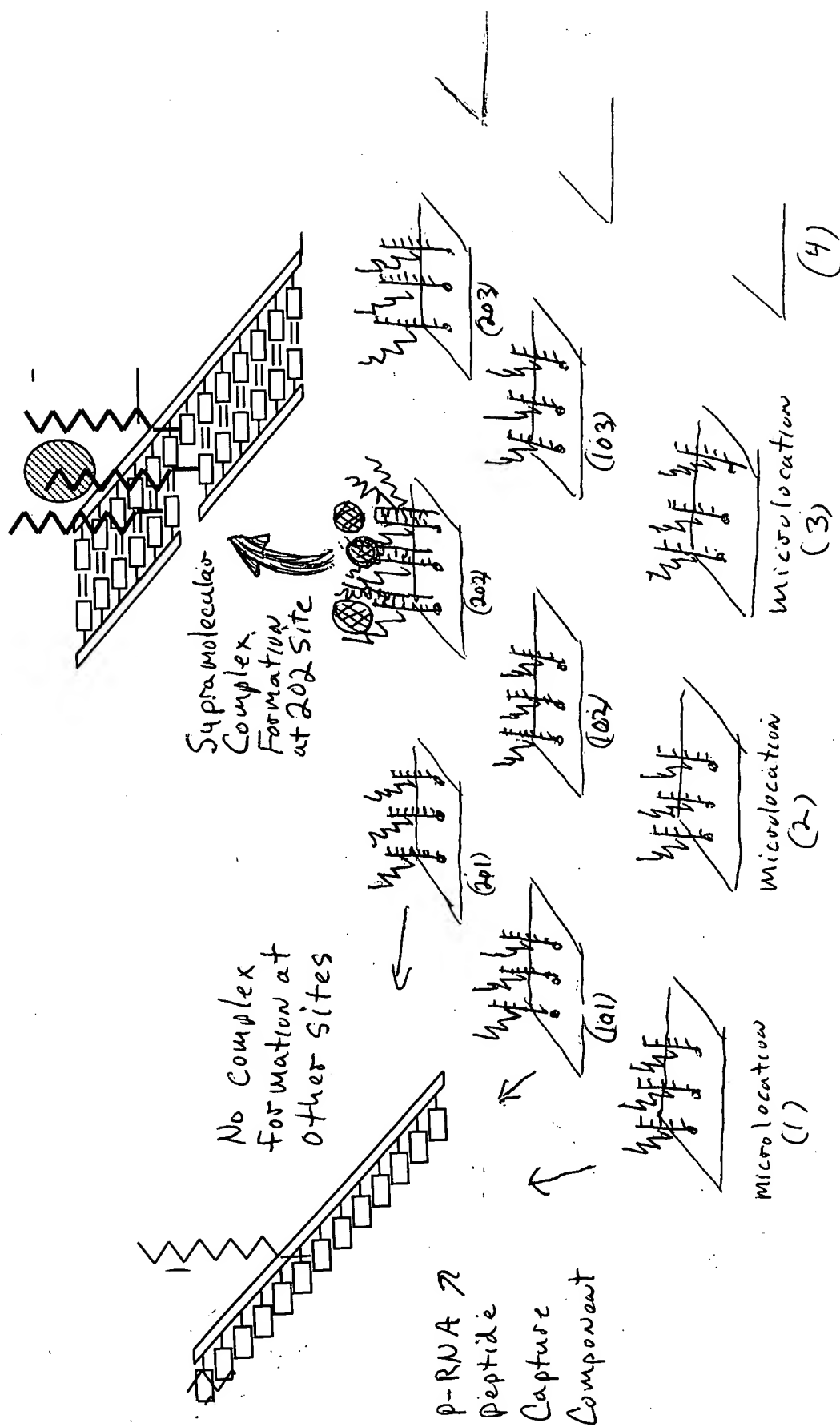


Figure-6 ELOC Process and Supramolecular Complex on Array



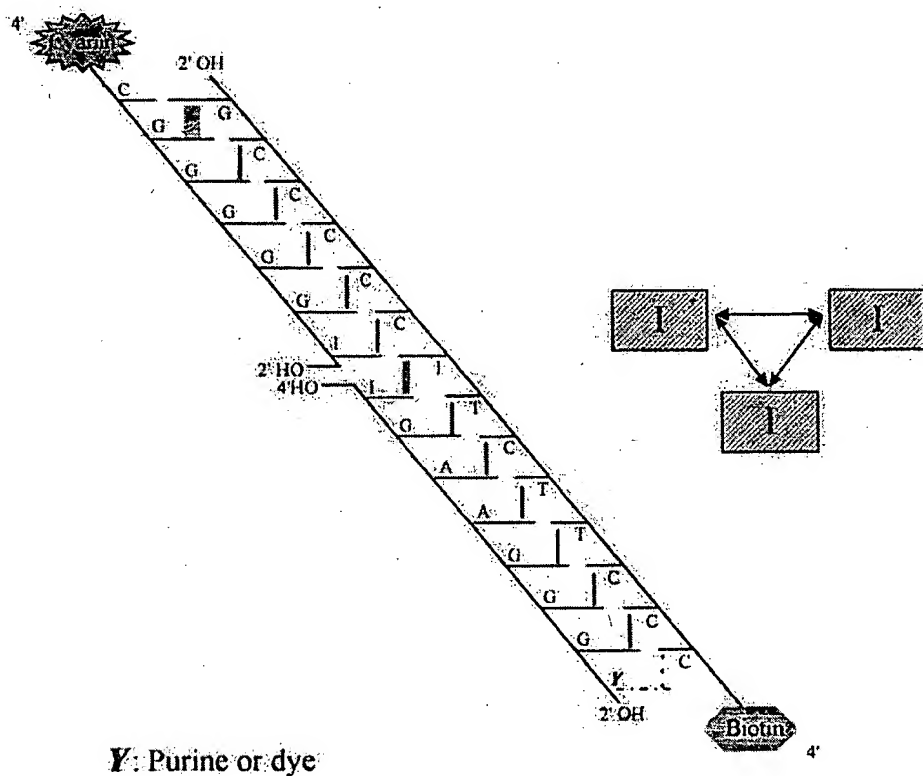
Portion of Microelectronic ELOC Chip

Figure 7- Fully hybridized 7-mer p-RNA A, 7-mer p-RNA B, and complementary capture p-RNA C.

Oligo 90: 4' IGAAGGGY 2'

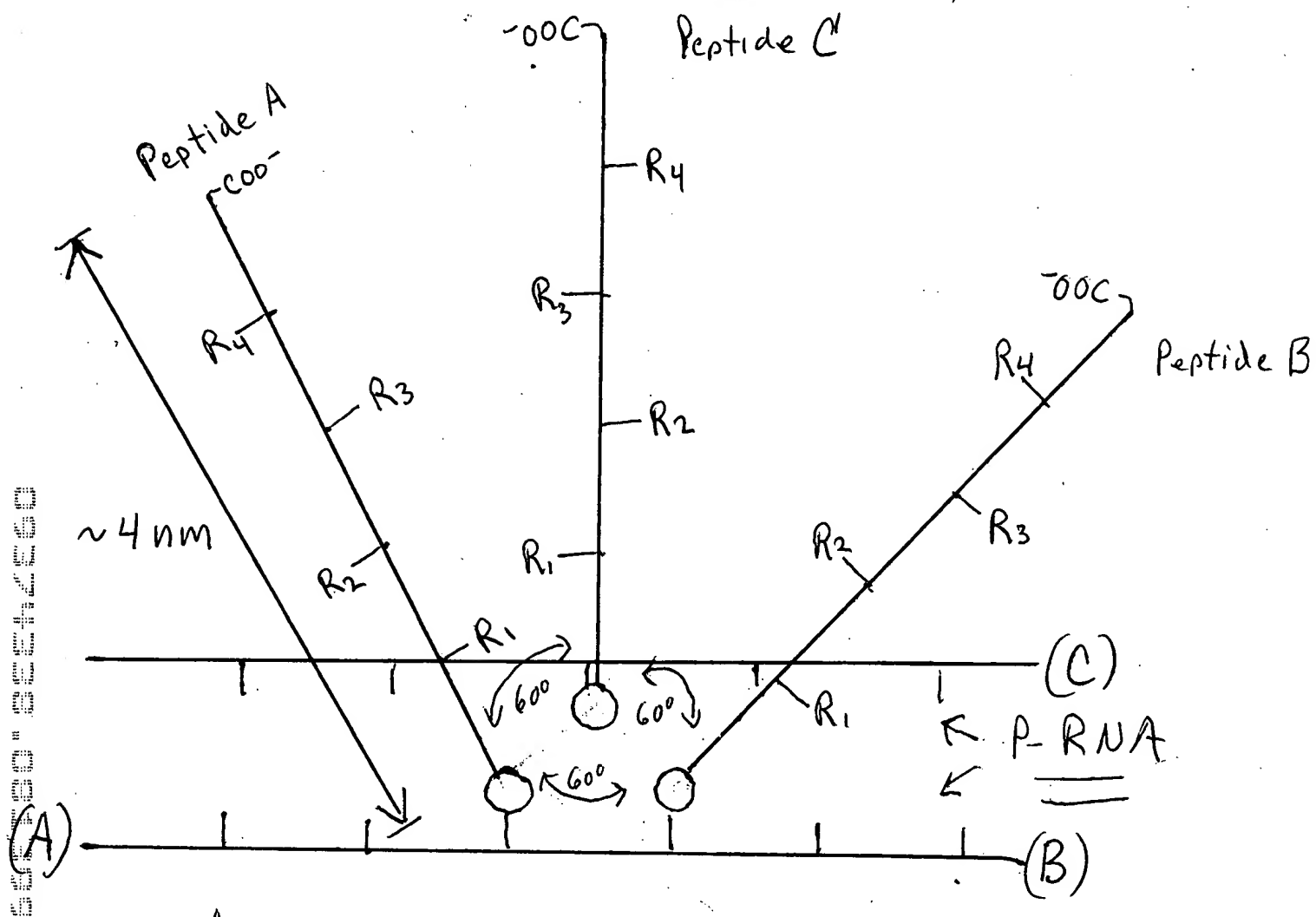
Oligo Cy91: 4' Cyanine-CGGGGGI 2'

Oligo Biot92: 4' Biotine-CCCTTCTICCCCCG 2'



007433-004200

Figure 8- Dimensional Geometry of Hexamer Peptide Triad



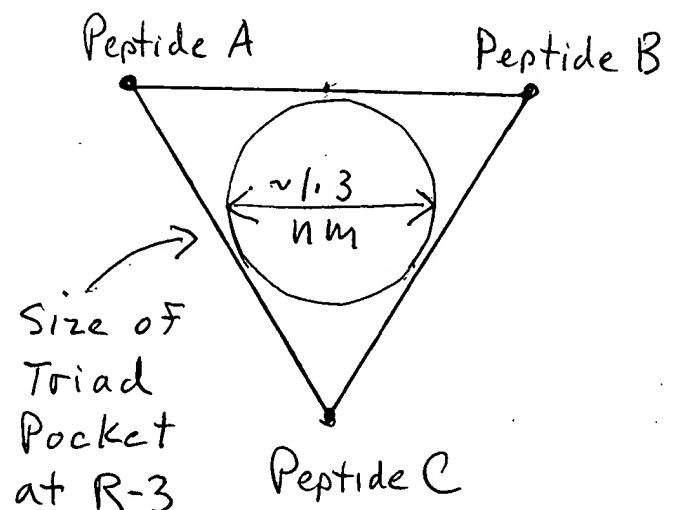
Amino Acid R Groups

$R_1 \sim 0.6 \text{ nm}$

$R_2 \sim 0.96 \text{ nm}$

$R_3 \sim 1.3 \text{ nm}$

$R_4 \sim 1.7 \text{ nm}$



552733" 3224250

Figure 9 - p-RNA-Peptide "Triad" Suprastructure
Complex Binding a Biotin Molecule

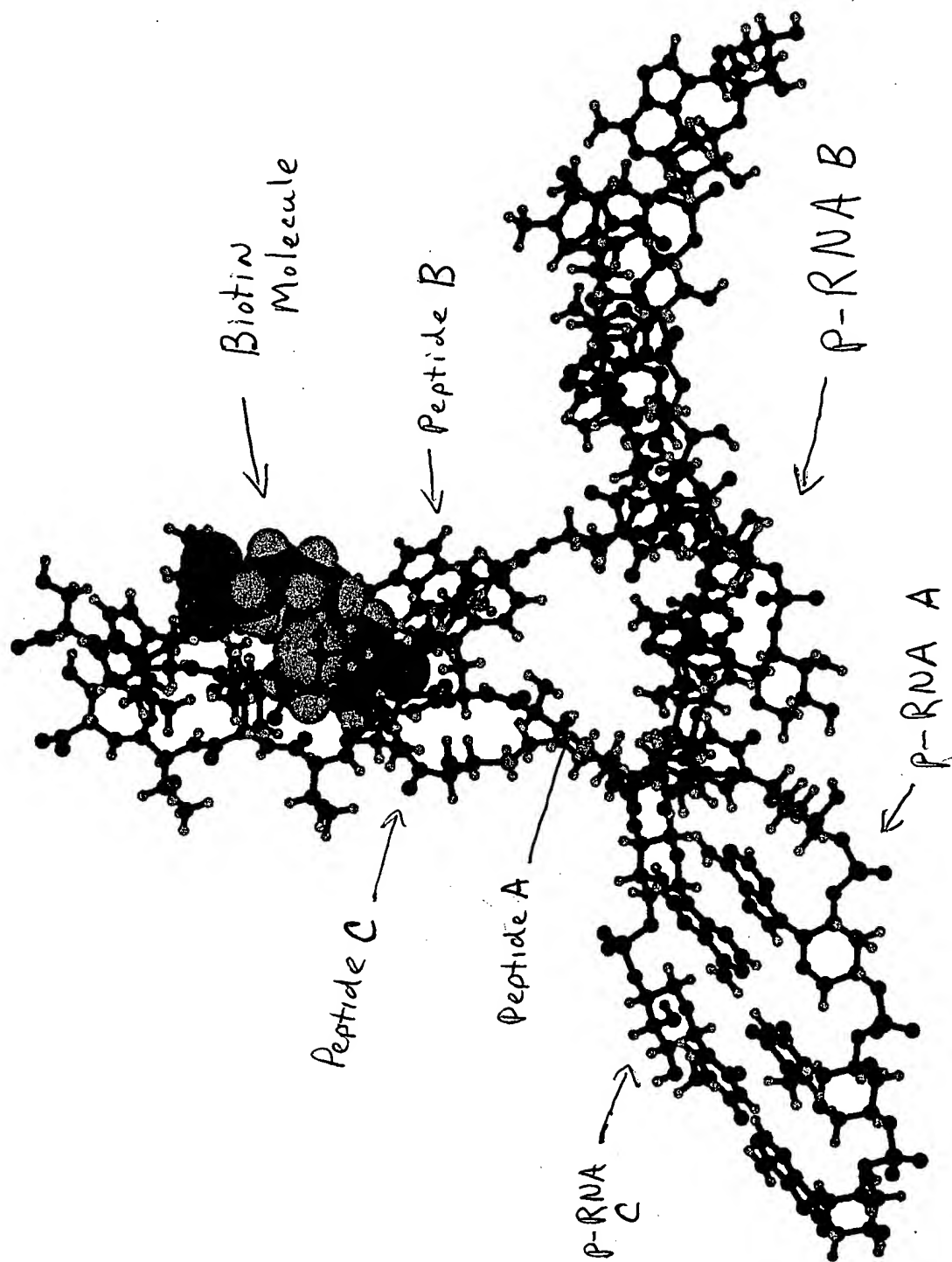
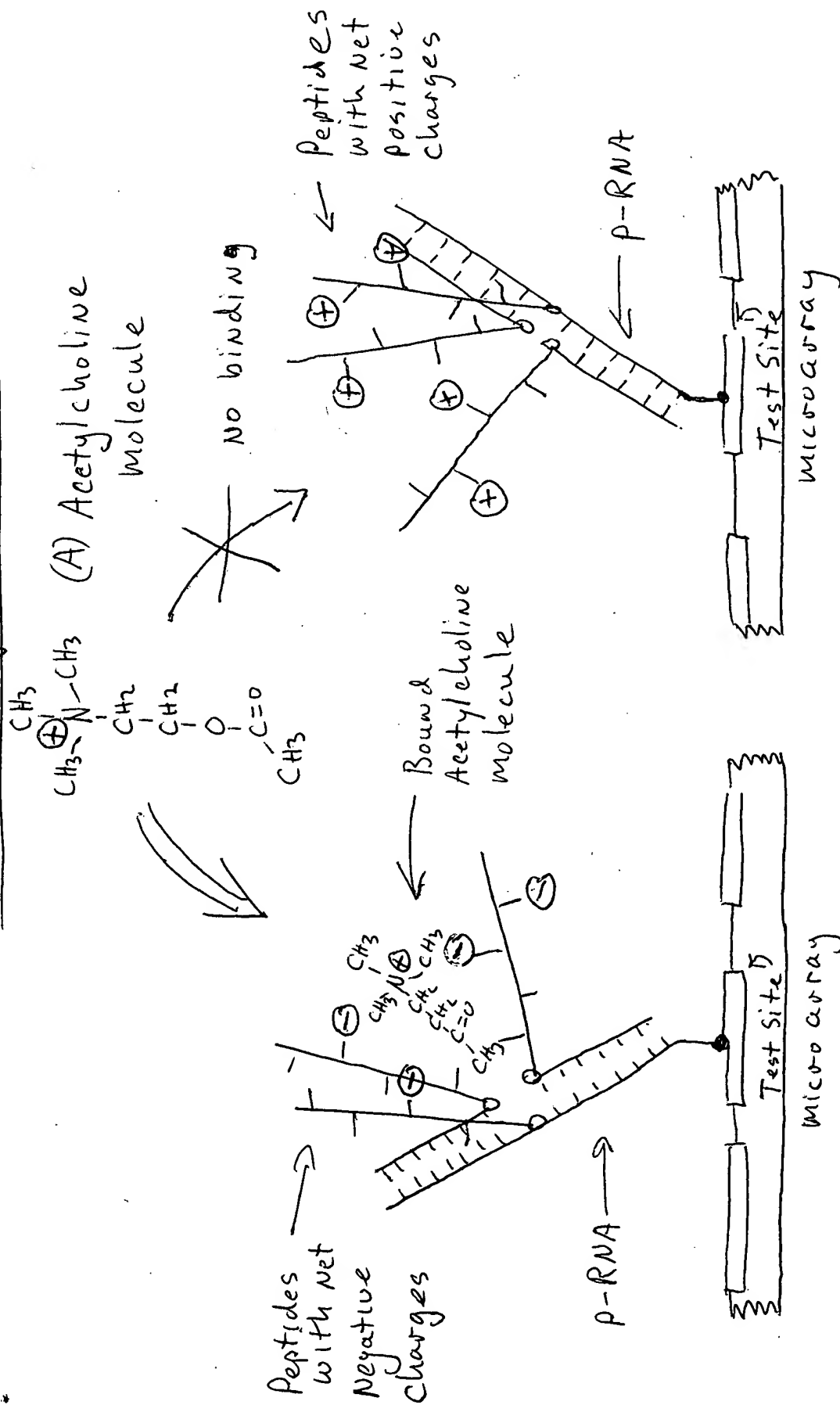
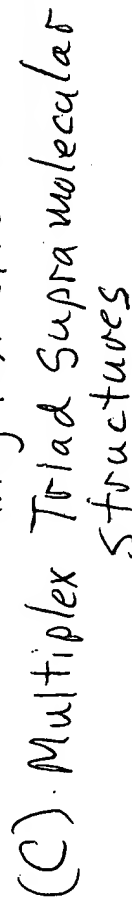


Figure 10 - Favorable and Unfavorable Peptide Triads for Binding Acetylcholine





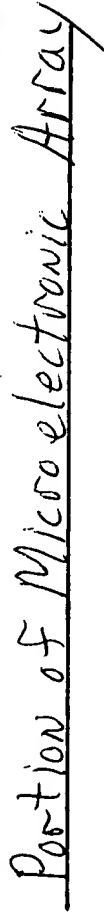
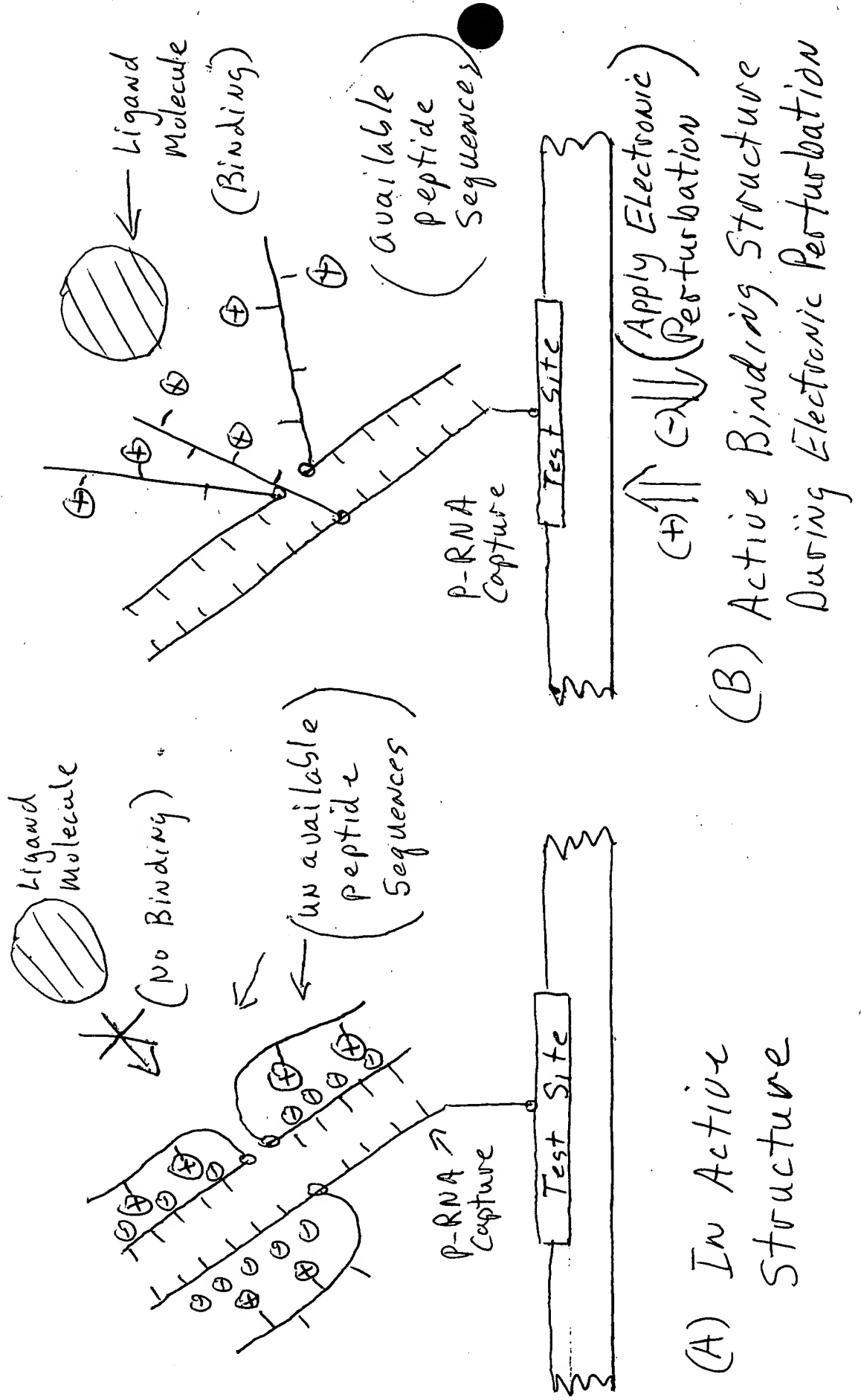
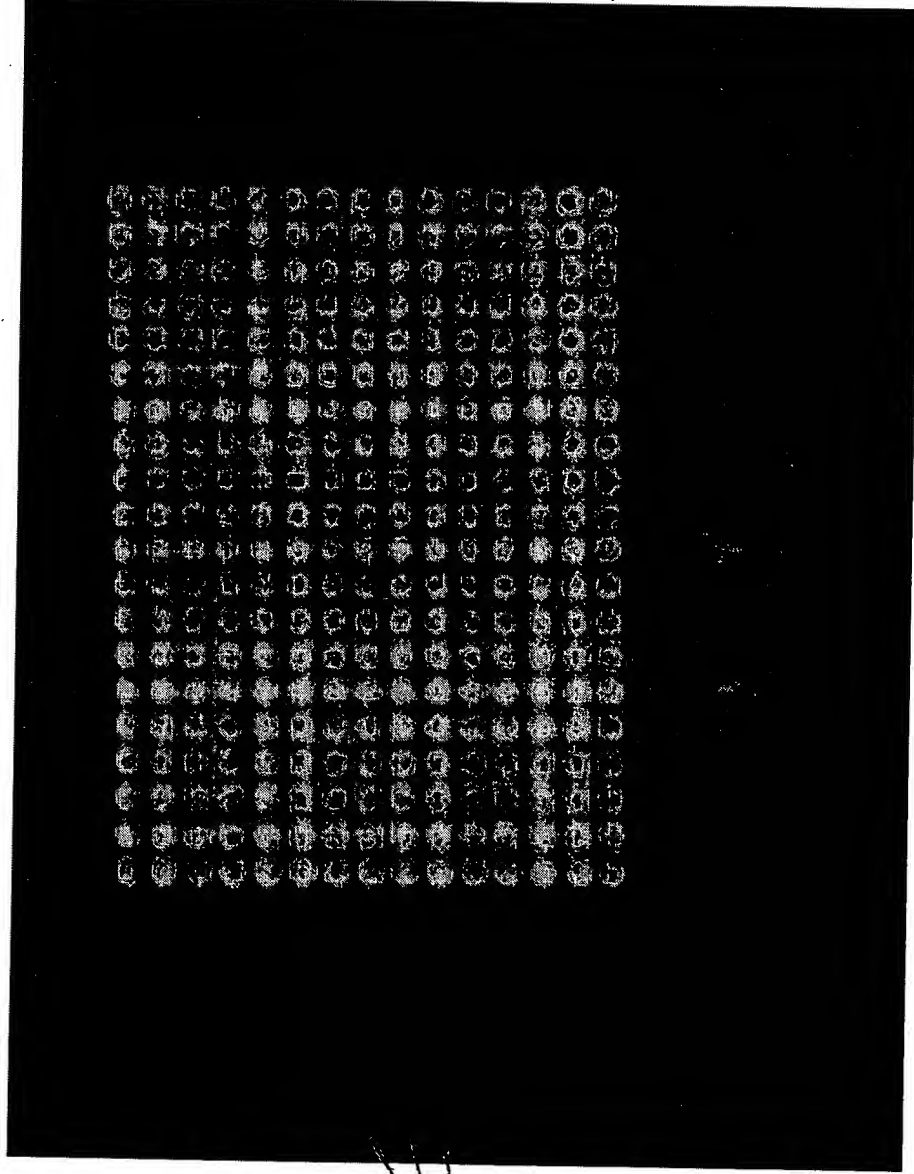


Figure 13 - Electronic Perturbation to Improve Ligand Binding



66E180" 66E42E60

Figure 14- Specific p-RNA Hybridization on
10,000 Site Microelectronic Array



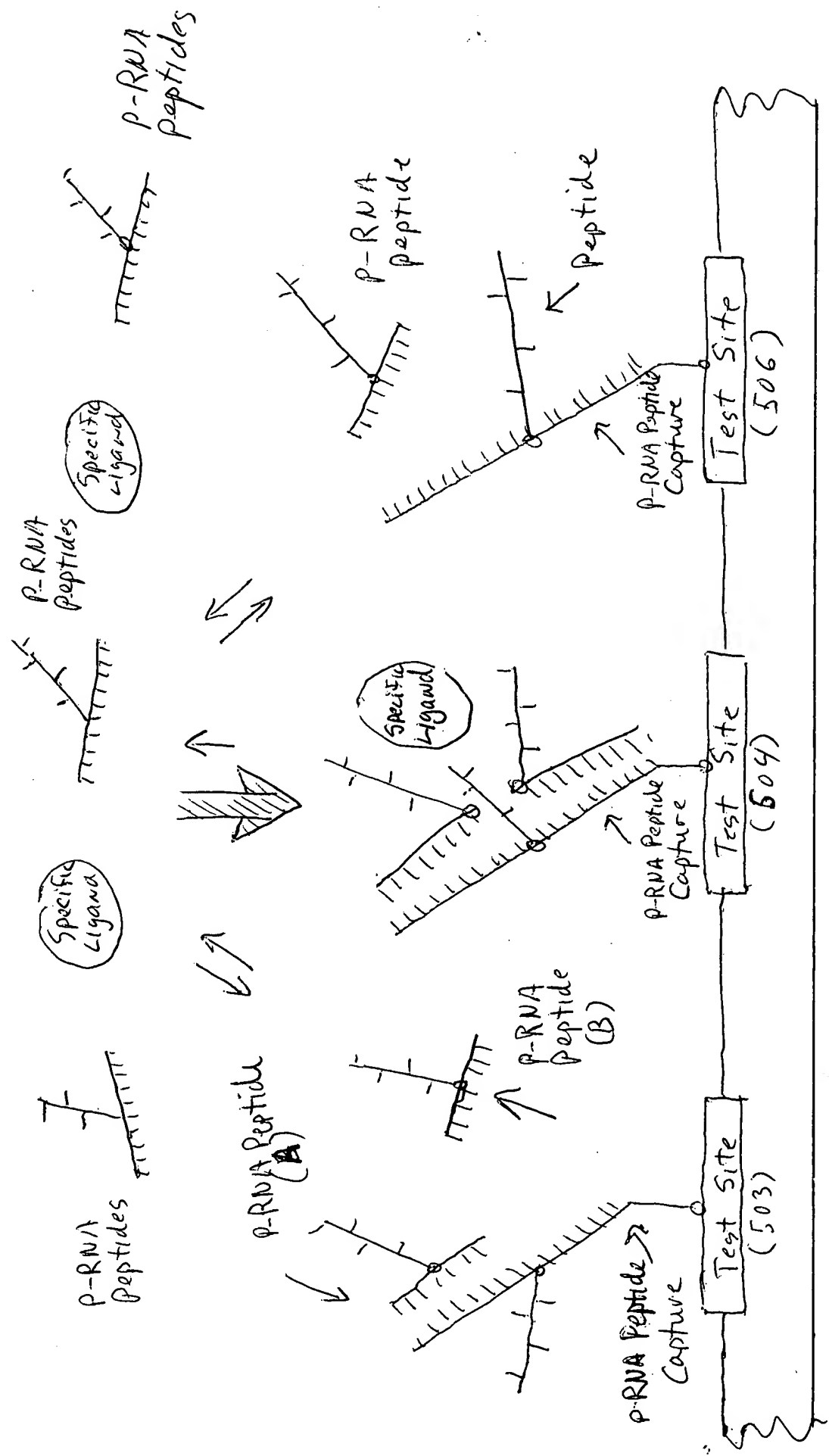
30 Micro
test Sites

Specific p-RNA
Capture (92-)
Hybridized with
p-RNA 91-CY3

Non-Specific
Capture p-RNA
72

Portion of 10,000 site Microelectronic
Array

Figure 15- ELOC₅₀₃ Format 150 Transition
 Dynamic Equilibrium Triad Formation



Portion of Microelectronic Array

Figure 16 - ELCD Format 2 - Homogeneous
 Triad Formation Process

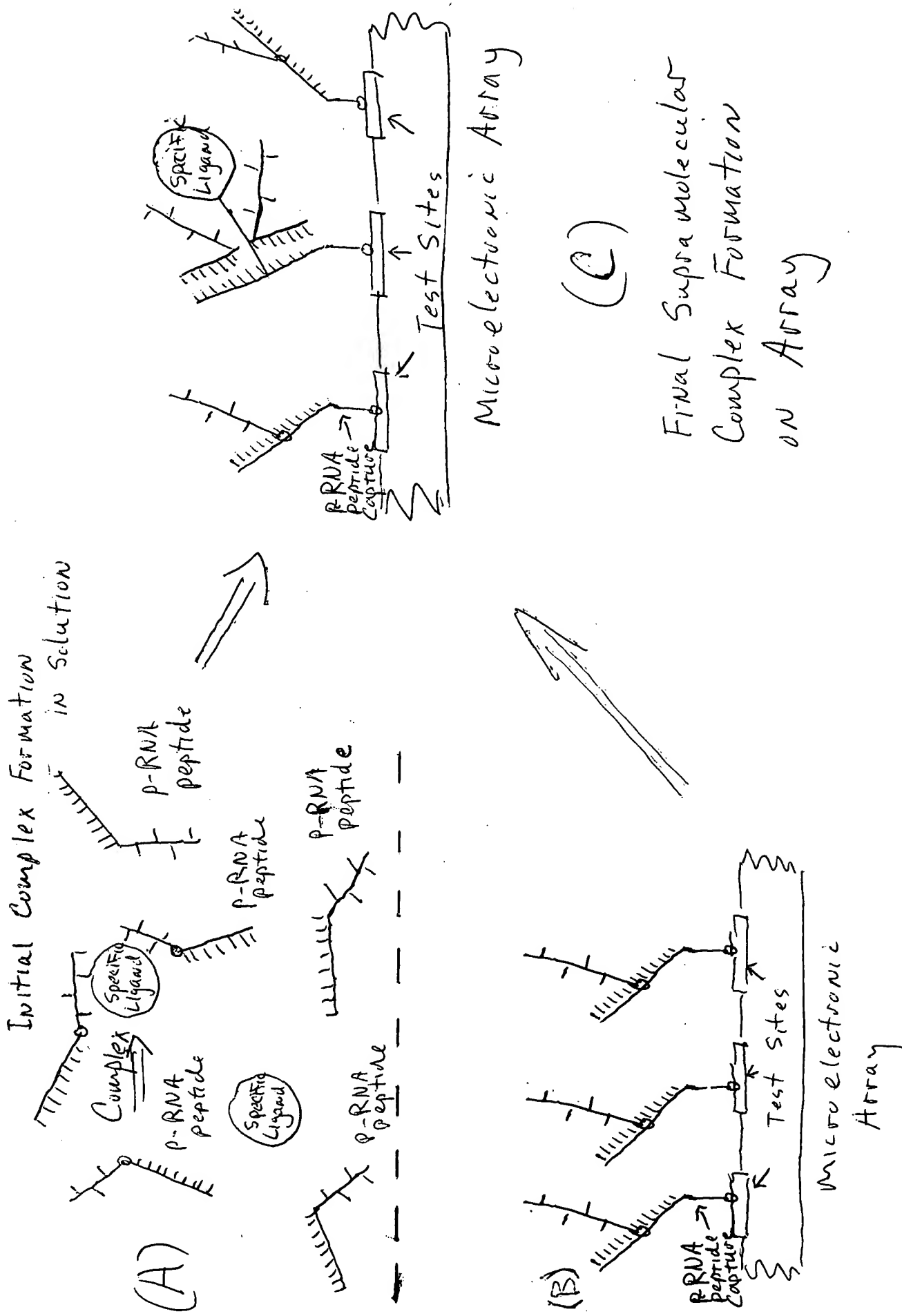
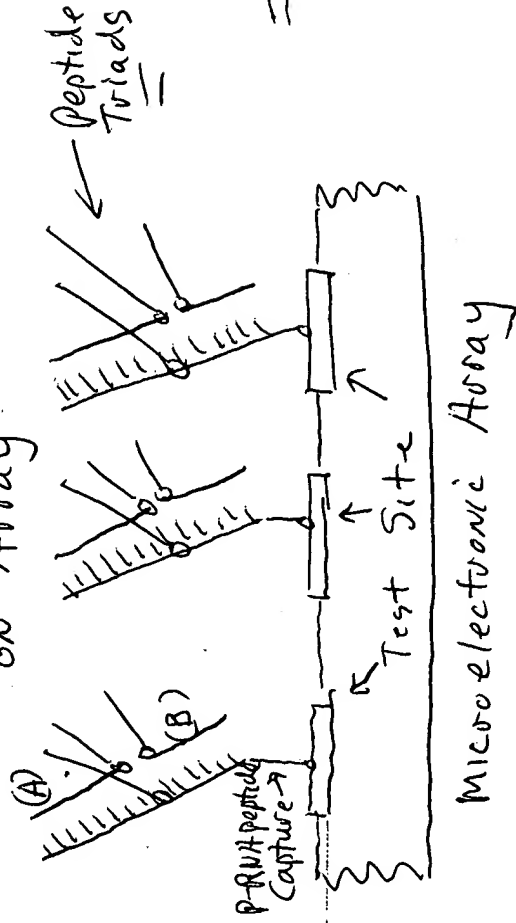


Figure 17- ELCC Format 3 - Heterogeneous Triad Formation Process

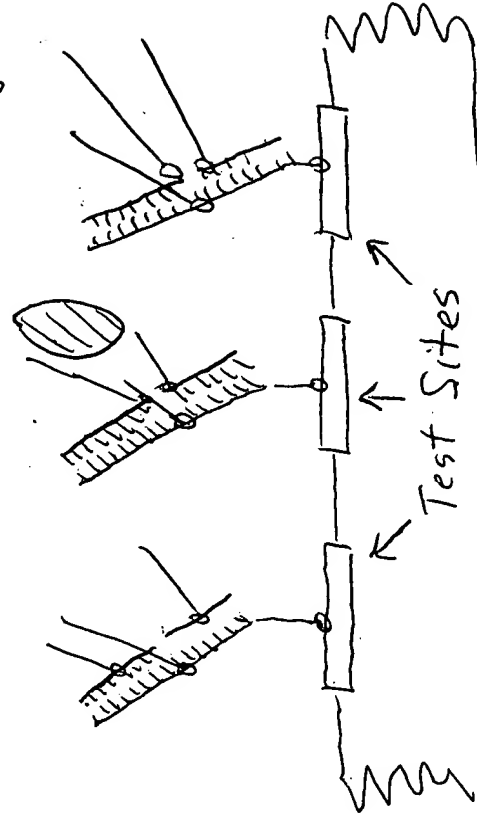
(A) Initial Formation of all supra molecular Structures on Array



Add Specific Ligands



Complex Formation with Specific Ligand



(B) Secondary Formation of Supra molecular Complexes on Array

Figure 18 - Multiplex P-RNA-Peptide Triads As Synthetic Antibodies For Immuno Assay

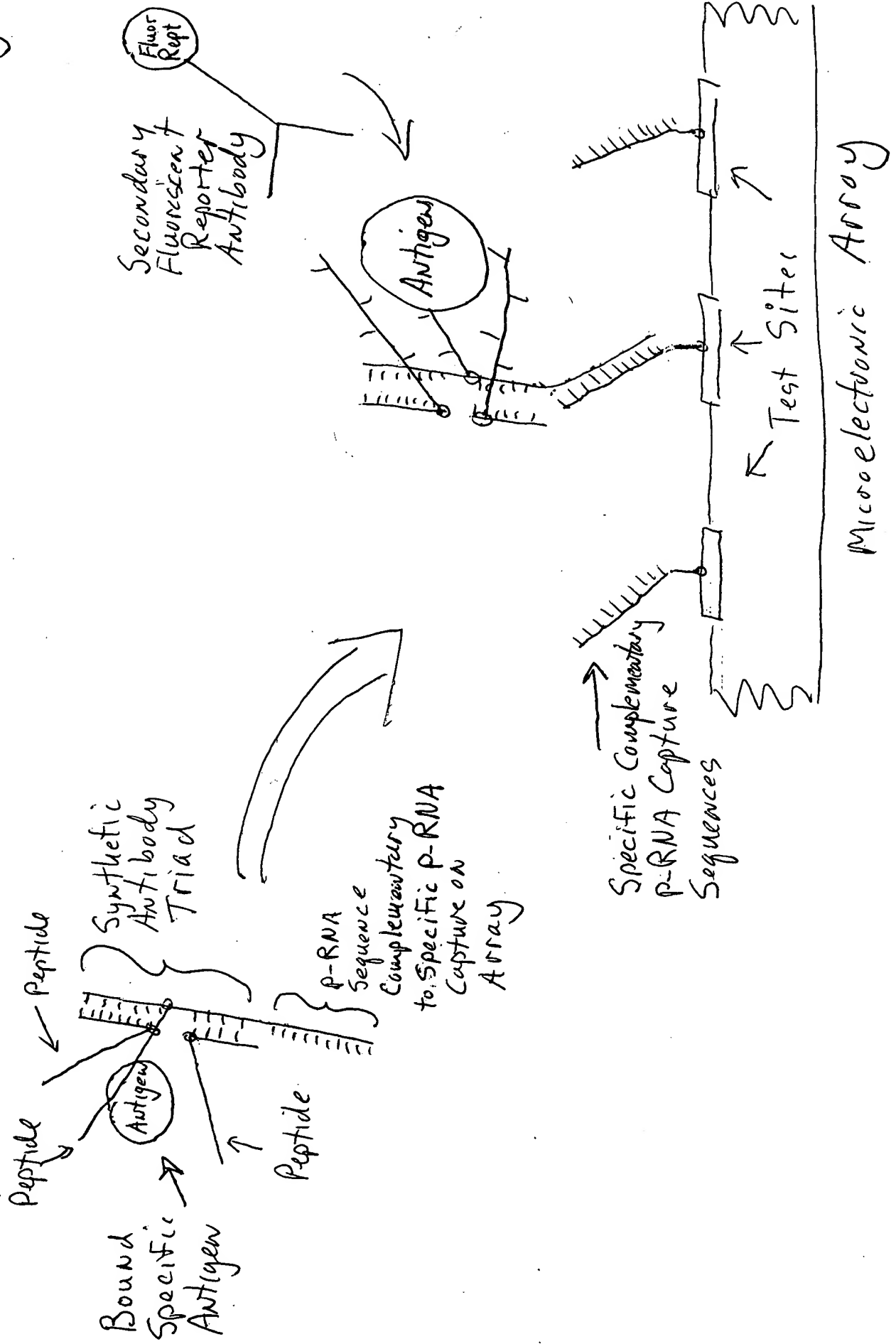
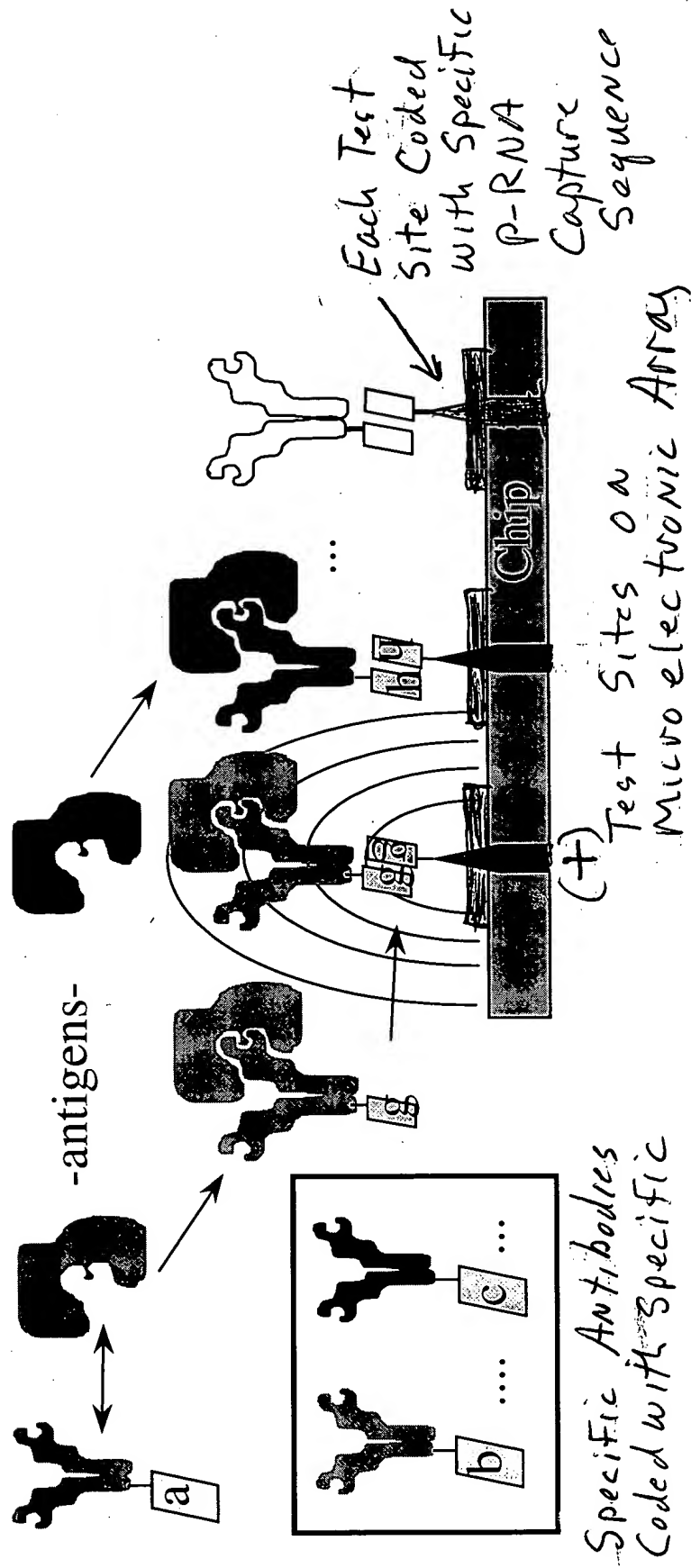


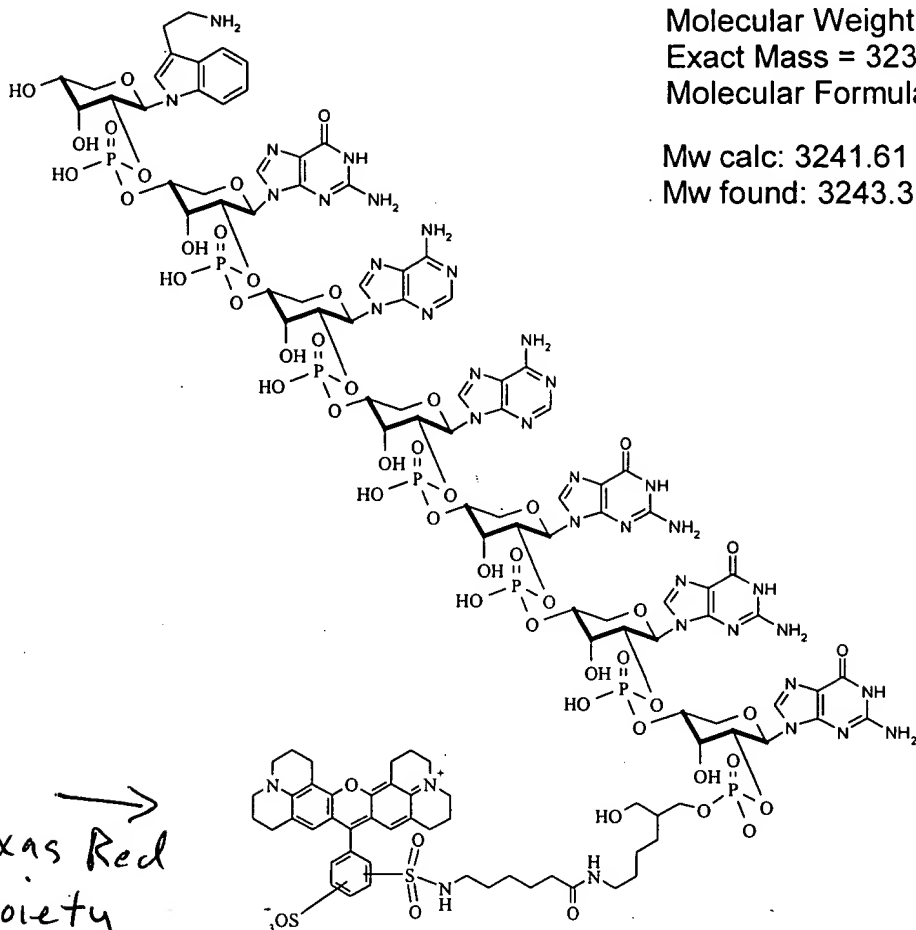
Figure-19 - Modular Immuno Assay Using p-RNA
Antibody Conjugates on Microelectronic
Array



Specific Antibodies
Coded with Specific

Complementary p-RNA
Sequences to those
Coded on the Array

Figure 20 - Structure and Mass Spec for TR-90-P-RNA Conjugate



Molecular Weight = 3241.61

Exact Mass = 3239.73

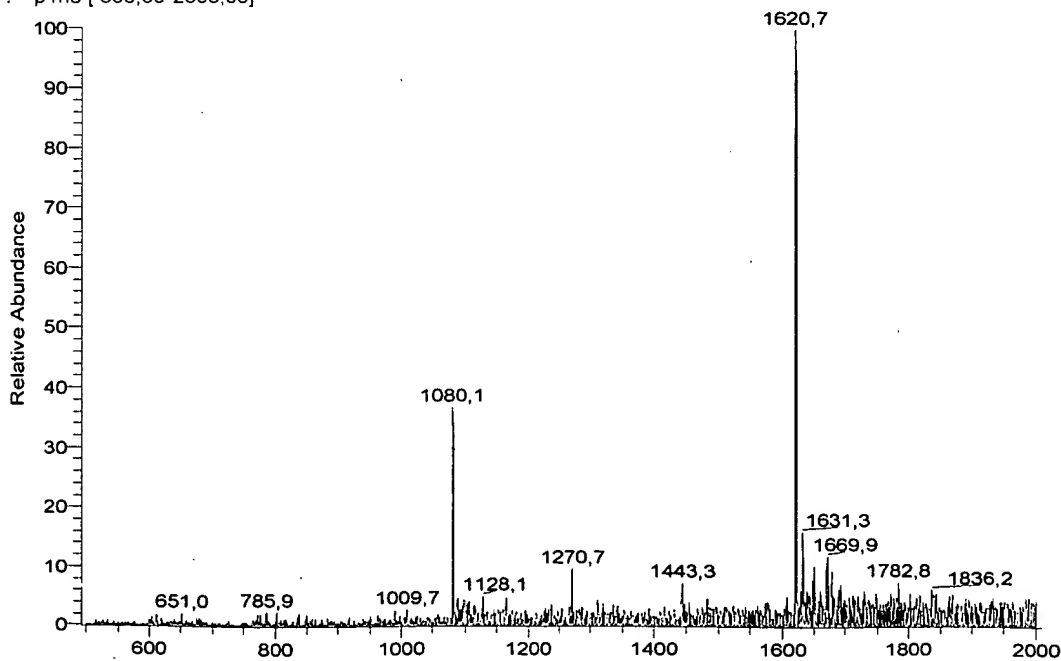
Molecular Formula = C₁₁₉H₁₄₆N₃₆O₅₅P₇S₂

Mw calc: 3241.61

Mw found: 3243.3 ± 0.5 (error~ 0.4%)

→
Texas Red
Moiety

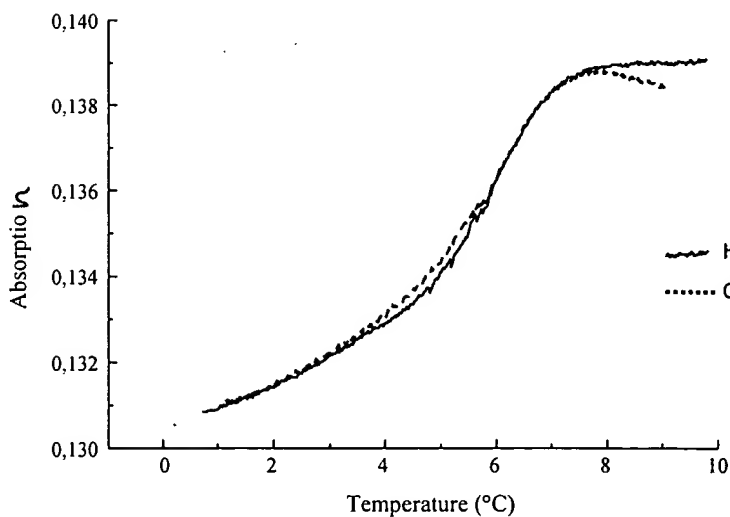
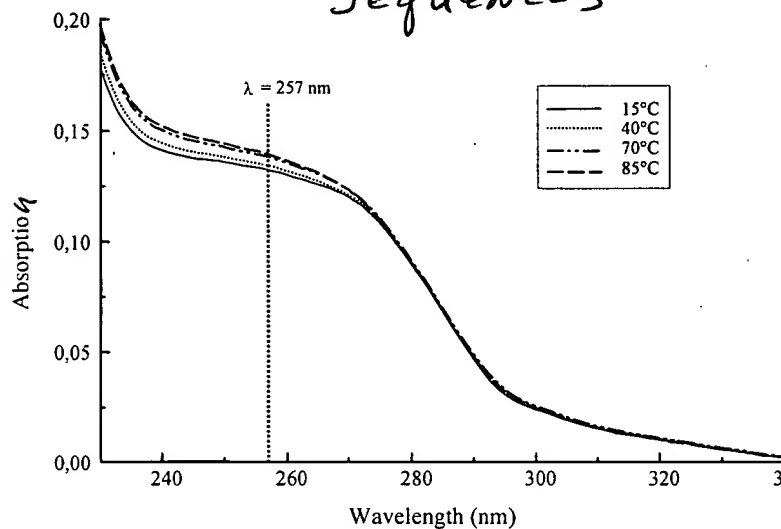
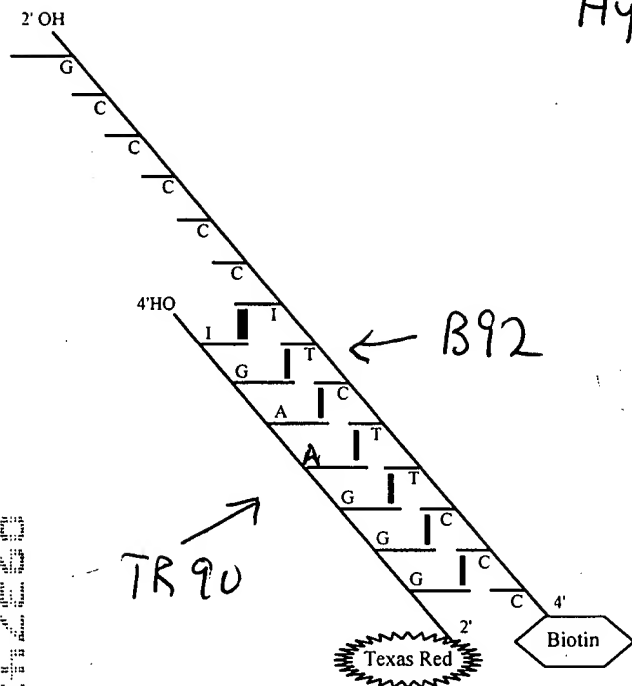
990566es1#13-15 RT: 0.49-0.56 AV: 3 NL: 6.96E3
F: - p ms [500.00-2000.00]



Oligo TR90: 4' IGAAGGG-TexasRed 2'

Oligo B92: 4' Biotin-CCCTTCTICCCCCG 2'

Figure 21- Structure for Hybridized TR-90 and B92 Sequences

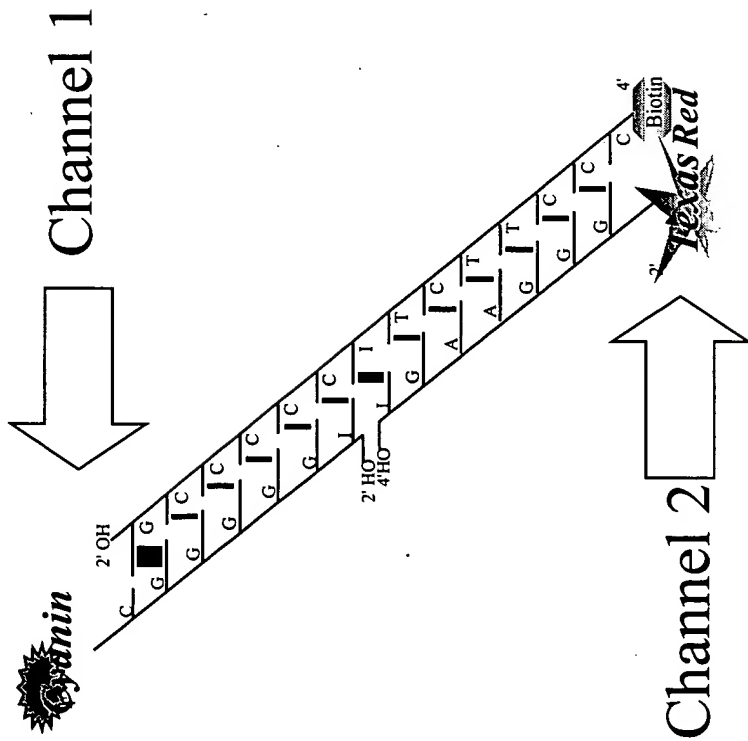


$T_m = 59^\circ\text{C}$
 Tris/HCl 0.01M ; pH 7
 0.15 M NaCl
 $c = 5\ \mu\text{M} + 5\ \mu\text{M}$

Oligo TR-90: 5'-**IGAGGGG-TexasRed** 2'

Oligo Cy3-91: 4' **Cyanine3-CGGGGI** 2'

Oligo Biot-92: 4' **Biotin-CCCTTCTICCCCCG** 2'



$T_m = 61^\circ\text{C}$
 Tris/HCl 0.01M; pH 7
 0.15 M NaCl
 $c = 5\ \mu\text{M} + 5\ \mu\text{M} + 5\ \mu\text{M}$

Figure 2.2
 Structure for
 Hybridized TR90,
 Cy3-91, and B92
 p-RNA Conjugates

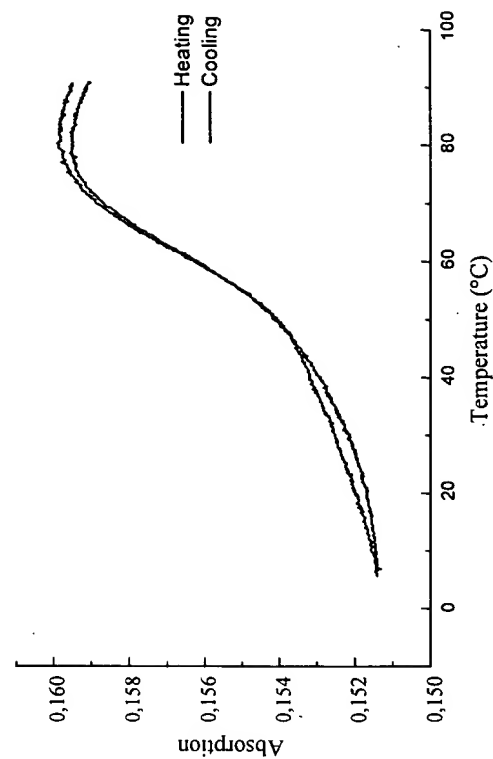
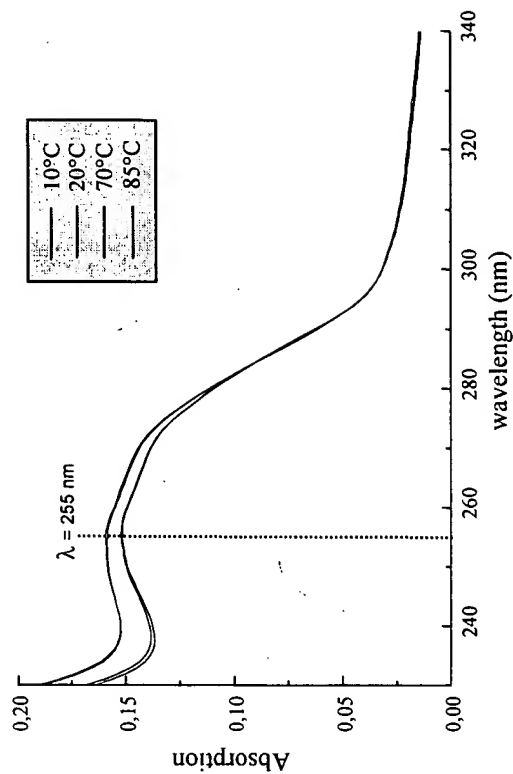
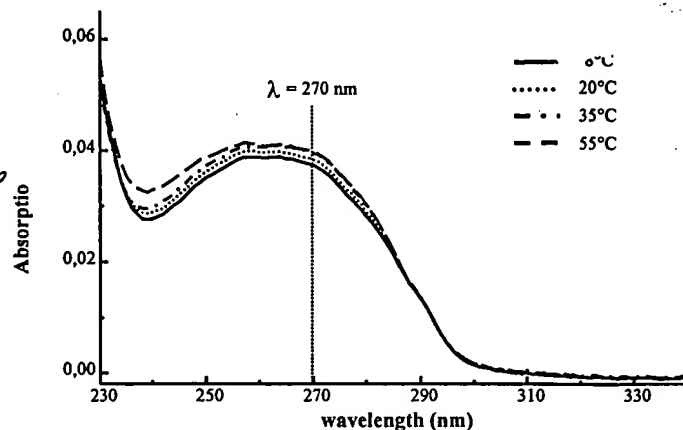
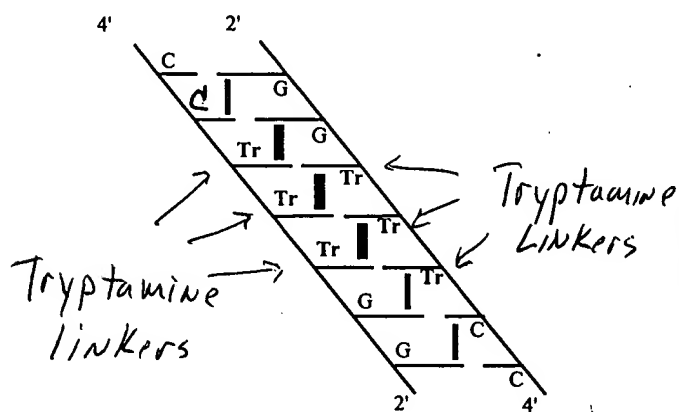
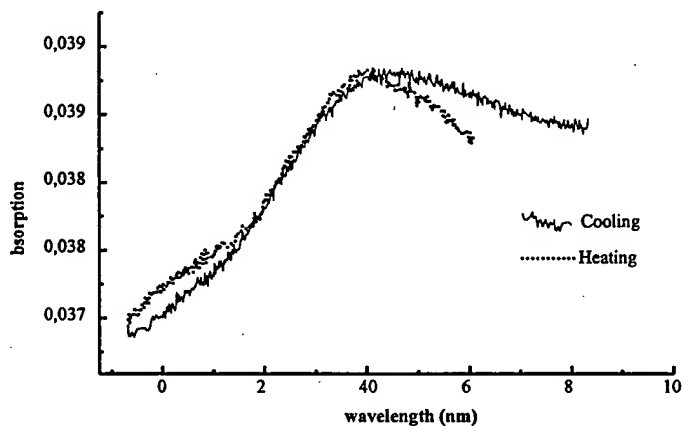


Figure 23- p-RNA Sequence with Multiple Tryptamine Linkers

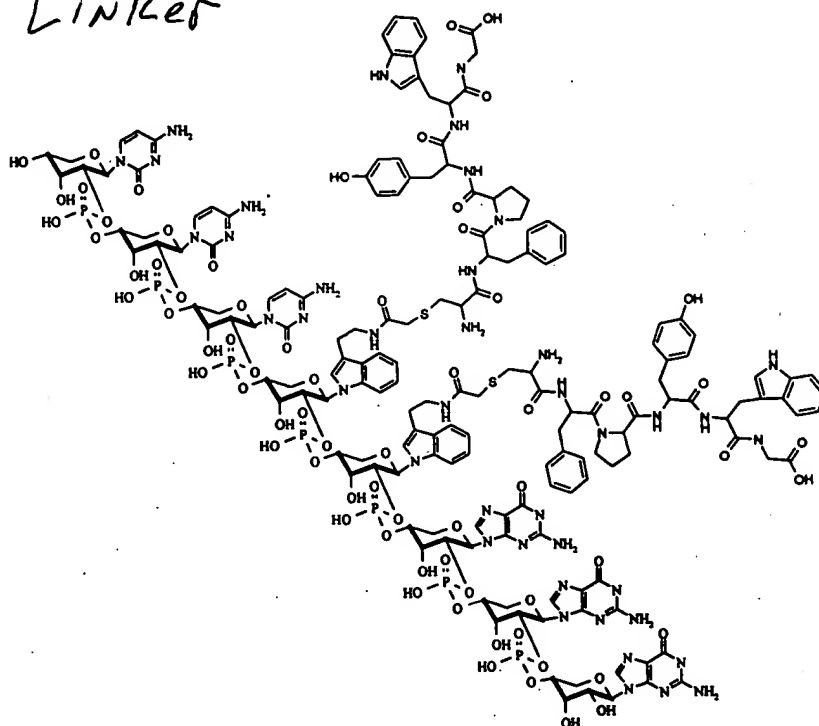


$T_m = 24^\circ\text{C}$
 Tris/HCl 0.01M; pH 7
 0.15 M NaCl
 $c = 10 \mu\text{M}$



Thermodynamic data of the self pairing p-RNA oligomer $4' \text{ CCTrTrTrGG } 2'$

Figure 24- p-RNA with Two Peptides via Tryptamine Linker



990359es1_990504131638#92-111 RT: 3,77-4,57 AV: 20 NL: 4,68E3
F: - p Full ms [550,00-2000,00]

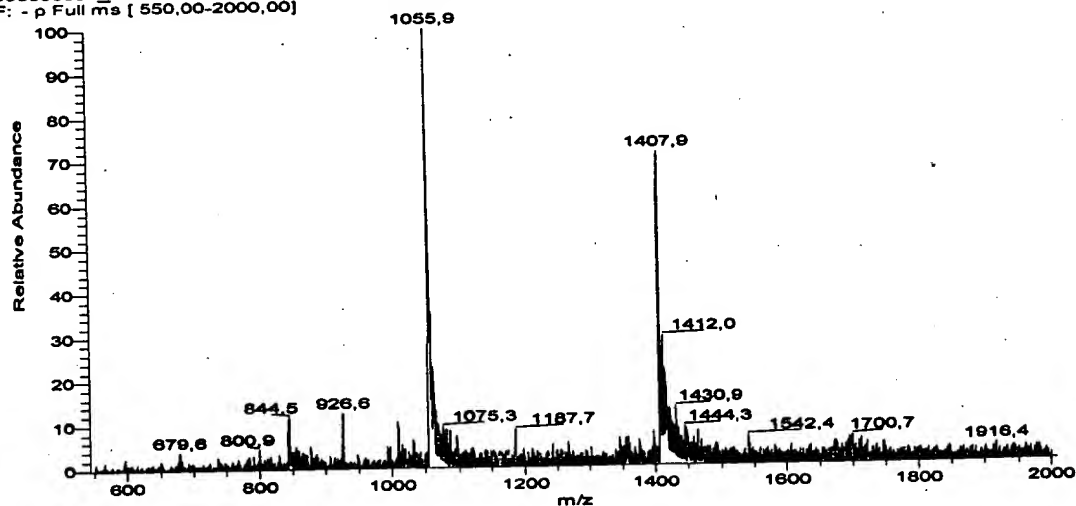


Figure 26 - Simulation of Measurements
with Noise

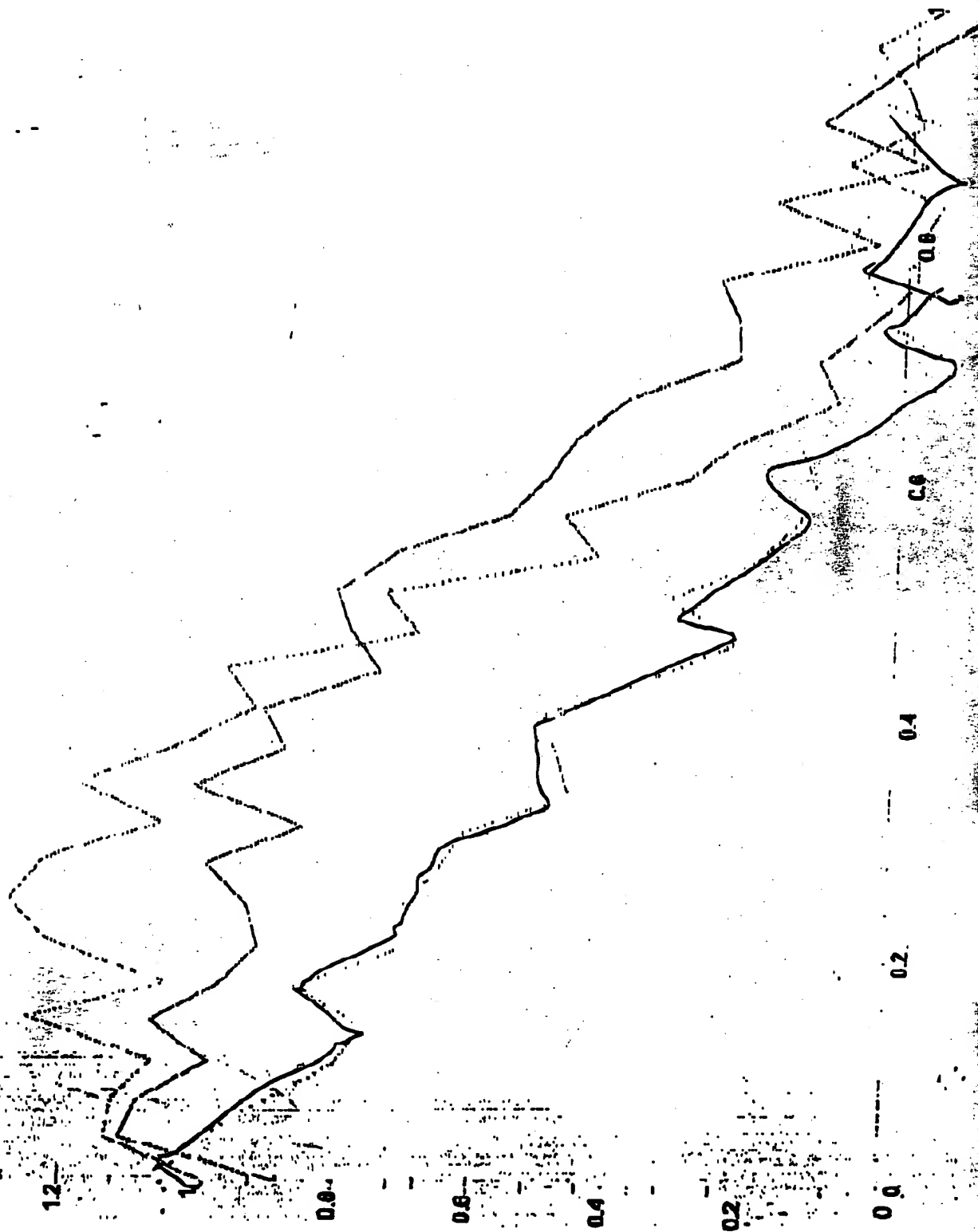


Figure 27 - Idealized Signal Development

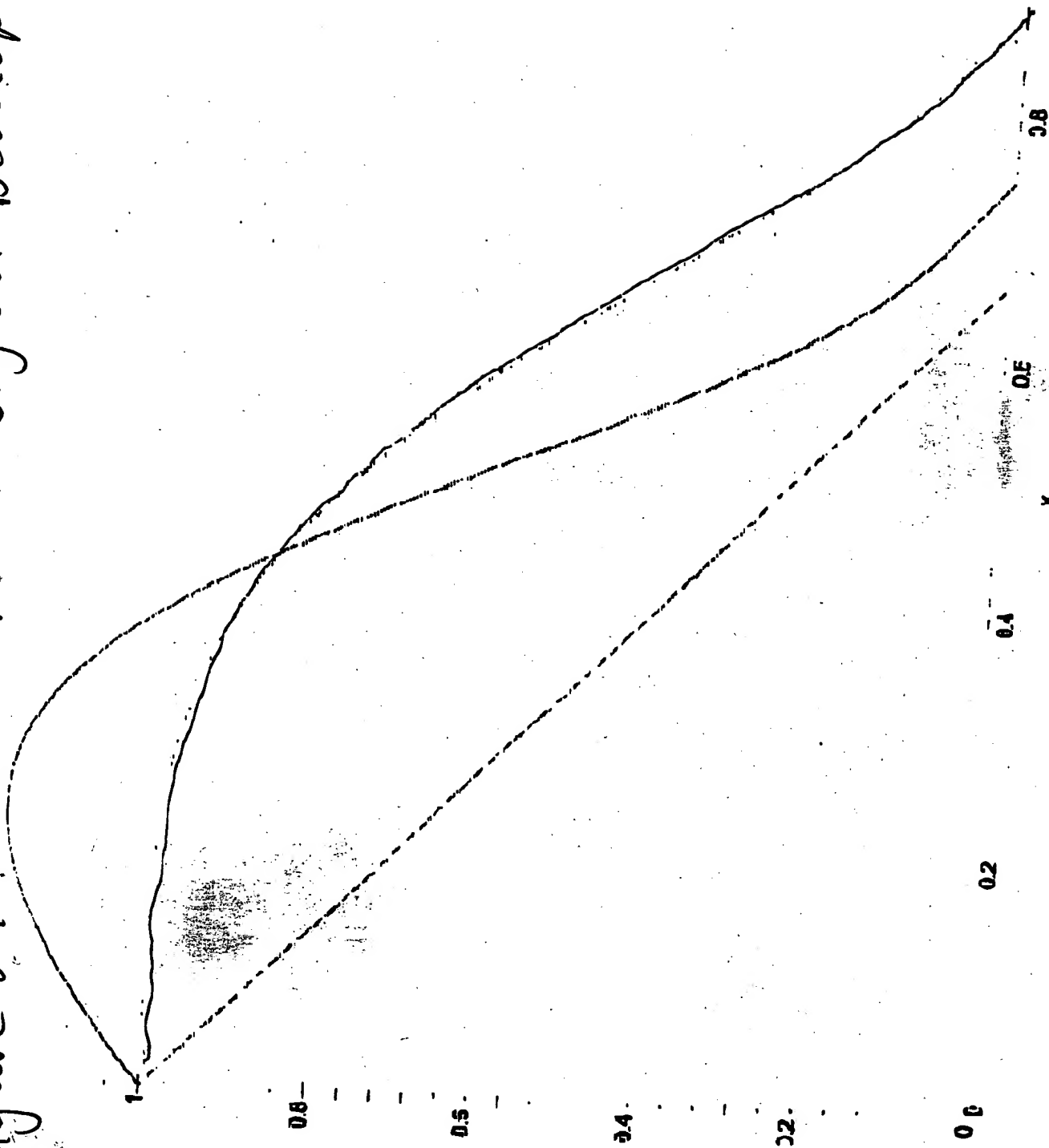


Figure 28

A scatter plot showing the relationship between Factor 1 (horizontal axis) and Factor 2 (vertical axis). The horizontal axis ranges from -2.5 to 1.0, and the vertical axis ranges from -0.8 to 0.6. The plot displays three distinct groups of data points, represented by open diamonds:

- 7 positions with event of type II:** Located in the lower-left quadrant, with Factor 1 values between -2.5 and -1.5, and Factor 2 values between -0.3 and -0.6.
- 9 990 positions with event of type III:** A large, dense cluster centered around Factor 1 = 0.0 and Factor 2 = 0.0.
- 3 positions with event of type I:** Located in the upper-right quadrant, with Factor 1 values between 0.5 and 1.0, and Factor 2 values between 0.1 and 0.4.